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'I Use ChatGPT, but Should I?' A Multi-Method Analysis of Students' Practices and Attitudes Towards AI in Higher Education

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ABSTRACT

Artificial intelligence (AI) tools have the potential to revolutionise educational practices, but their use raises ethical and organisational concerns for higher education institutions (HEIs). We investigated Italian students' perception and usage of AI tools at the University of Udine using questionnaires ($N=531$) with fixed and open-ended items and semi-structured interviews ($N=60$). The findings reveal that while over two-thirds of students use ChatGPT for personal purposes, 40.9% employ it for academic tasks, primarily for summarisation, clarification and content generation. Most students (70%) expressed awareness of ethical concerns, and 55% saw the potential value in using AI, if regulated, for specific learning activities. Students generally did not perceive a direct threat to their studies or career prospects, although 60% voiced reservations about potential negative impacts on broader societal functions. These results underscore the need for HEIs to implement regulations for AI tool use to balance innovation with ethical challenges.

1 | Introduction

This paper investigates university students' familiarity with using generative artificial intelligence (GenAI) systems, such as ChatGPT, and analysed their perceptions and future expectations of these technologies. This study focused on students enrolled in various degree programmes (undergraduate, master's and PhD) at the University of Udine and forms part of a larger interdepartmental research project on artificial intelligence (AI) at the university.

AI has become a significant and long-standing presence in our lives. Its origins as a formal research discipline can be traced back to 1956, with the Dartmouth Summer Research Project on AI in Hanover, New Hampshire, which is widely acknowledged as setting the stage for decades of research and development in the field (e.g., Skinner 2012). AI has long been a fundamental yet

often invisible component in the development and operation of numerous technological systems, performing crucial processes and functions (e.g., voice recognition) that are often taken for granted by the users. However, most people only became aware of AI in the autumn of 2022 for a seemingly 'simple' reason: it began performing tasks that human beings are also capable of, such as answering questions, writing and creating artwork. The advent of tools such as OpenAI's ChatGPT represents merely one aspect of a broader transformation, as GenAI is increasingly being incorporated into word processors, image, music and video editing software, as well as databases and spreadsheets. Software such as ChatGPT represents a subset of the field of AI, but it is important to note that while these AI tools are capable of learning, they lack the capacity for understanding. This is reflected in the nomenclature used for the algorithm they enable: 'deep learning' rather than 'deep thinking' or 'deep knowing'.

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The advent of these tools and the transition of AI from an object of study in the laboratory to a technology used in everyday life have given rise to a wide-ranging debate on the social implications of AI adoption across various fields (e.g., Obrenovic et al. 2024). In light of the increasing diffusion of GenAI technologies, this paper focuses specifically on the context of higher education institutions (HEIs; Chiu et al. 2023) and investigates the level of familiarity university students have with these tools and their views about such tools. A multi-method approach has been adopted that combines questionnaires ($N=531$) containing fixed and open-ended items and semi-structured interviews ($N=60$). The following research questions are addressed:

1. How familiar are university students with GenAI tools like ChatGPT? To what extent do they use these tools for both personal and academic activities?
2. What are students' perceptions regarding the use of AI within the university environment? What are the potential benefits and challenges associated with using GenAI in teaching and learning?
3. What are students' views on the future prospects of GenAI use at university and in the job market?

After this introductory section, the remainder of this paper is organised as follows: Section 2 provides a comprehensive review of relevant literature, presenting both theoretical and empirical state-of-the-art insights, as well as outlining the advantages and challenges of integrating GenAI within higher education. Section 3 illustrates the methodology approach. Sections 4 and 5 present the salient findings derived from the survey and the interviews, respectively. Finally, Section 6 draws conclusions based on the insights obtained.

2 | Theoretical Background

Although GenAI is a relatively recent innovation, scholars have long been interested in exploring the potential applications of AI in educational settings, with growing emphasis on adaptive teaching approaches, personalised learning methods and classroom use (for a comprehensive review of the role of AI in education from 2012 to 2021, see Chiu et al. 2023). The current landscape, however, differs markedly from the past, mainly due to the widespread adoption of ChatGPT and other natural language processing tools, which have introduced novel challenges and opportunities. Given the relative novelty of these tools, however, few sources have adequately addressed students' use and perspectives of ChatGPT and similar GenAI systems, and peer-reviewed articles on the subject are lacking (Gamage et al. 2023).

This gap is significant because students' perceptions of emerging technology often influence both the adoption rate and the efficacy of these tools within the learning process (Biggs 2011). Investigating how students perceive the benefits and drawbacks of ChatGPT, alongside contextual factors that influence acceptance or rejection, is therefore paramount. Insights from such studies can guide educators, policymakers and developers in creating strategies to ensure responsible and effective integration of ChatGPT and similar tools in education by addressing specific needs and challenges.

Davis's (1989) technology acceptance model offers a theoretical framework for analysing student adoption and use of GenAI tools in education. The model hypothesises that attitudes towards technologies are primarily determined by perceived usefulness (i.e., represents the degree to which users believe a technology will improve their performance) and perceived ease of use (i.e., the perceived effort involved in its use). The technology acceptance model posits that intention to adopt is significantly influenced by perceived usefulness: a technology perceived as beneficial is more likely to be adopted and used.

In general, the extant literature suggests that ChatGPT is a valuable tool that can enhance the learning experience and improve educational efficiency (Kasneci et al. 2023; Lund et al. 2023). The studies conducted thus far have indicated that students have a positive perception of ChatGPT in terms of learning, research and personal study. Students appreciate ChatGPT's ability to provide personalised support, including tailored feedback and the maintenance of coherent interactions over time (Atlas 2023; Huallpa et al. 2023). Students perceive ChatGPT as a potential virtual tutor or study partner (Chan and Hu 2023; Hasanein and Sobaih 2023) that can answer their questions (Lo 2023) and improve their skills, including in foreign language acquisition (Baskara and Mukarto 2023; Rahim et al. 2023). Students also believe ChatGPT can assist them with academic tasks, such as homework and assignments (Hasanein and Sobaih 2023), articulating ideas (Ngo 2023), facilitating comprehension of complex concepts (Adiguzel et al. 2023; Bailey et al. 2021; Shaengchart et al. 2023) and motivating them to learn due to its engaging and interactive nature (Ali et al. 2023; Asif et al. 2023; Muñoz et al. 2023). Previous studies have demonstrated that students find ChatGPT to be useful in a number of ways. It assists them in locating and synthesising information (Elkhodr et al. 2023; Hasanein and Sobaih 2023) and in collecting and processing large datasets (Chan and Hu 2023; Lund et al. 2023), thus enhancing their problem-solving abilities (Elkhodr et al. 2023). It also facilitates improved writing efficiency (Bin-Nashwan et al. 2023; Farhi et al. 2023; van Dis et al. 2023) by providing guidance on the composition and organisation of study materials (Jowarder 2023; Shoufan 2023).

Despite these benefits, students have also expressed significant concerns regarding the limitations and potential misuse of ChatGPT. These concerns primarily pertain to ethical issues, plagiarism and academic integrity (Abdaljaleel et al. 2024; Bin-Nashwan et al. 2023). Among the principal ethical concerns related to the use of GenAI tools in an educational context, numerous studies have emphasised that some students view the deployment of these tools as a violation of societal values (Hasanein and Sobaih 2023). Such systems challenge the tenets of academic integrity and credibility, which may foster an environment conducive to cheating and plagiarism in examinations (Garg and Goel 2022; Gašević et al. 2023; Ibrahim et al. 2023; Michel-Villarreal et al. 2023; Trust et al. 2023).

Such practices not only highlight instances of academic misconduct but may also lead to an over-reliance on ChatGPT, which may result in students creating work based primarily on the tool's output, rather than employing their analytical skills (Adiguzel et al. 2023; Elkhodr et al. 2023; Jowarder 2023). This dependence could have a negative impact on the motivation

to perform independent research and development, ultimately hindering academic performance (Chan and Hu 2023; Kasneci et al. 2023). The continued use of ChatGPT in an educational context may thus have an adverse effect on essential skills such as critical thinking, reasoning, decision-making, problem-solving, imagination and research abilities, potentially leading to a decline in high-order cognitive skills (Alafnan et al. 2023; Imran and Lashari 2023; Sok and Heng 2024). In addition to concerns about the trustworthiness of their academic work, some students have also expressed apprehension that reliance on these tools may mask learning deficiencies, thereby impeding educators' ability to assess the actual degree of their understanding and implement appropriate intervention strategies (Grassini 2023; Sullivan et al. 2023).

Researchers have also raised concerns about the reliability and security of the information generated by ChatGPT (Chan and Hu 2023; Limna et al. 2023). The tool can produce inaccurate, false or misleading information (Farrokhnia et al. 2023; Rudolph et al. 2023), as well as fabricating articles and providing non-existent or ambiguous references (Baidoo-Anu and Ansah 2023). Because ChatGPT uses data produced before 2021, its responses may be unreliable regarding specific topics and recent events (Hassani and Silva 2023). Biases embedded in training datasets could also perpetuate social stereotypes or unfair discrimination (Sallam 2023; Zhai 2022) by reflecting narrow demographic perspectives. Examples of biases include an overreliance on studies from high-income countries or specific demographics, such as white men, and gender biases (Mbakwe et al. 2023).

The literature review suggests that the integration of ChatGPT and similar GenAI tools in educational settings presents a double-edged sword. On the one hand, ChatGPT can enrich learning, streamline research and provide personalised study support. On the other, such use can introduce ethical, cognitive and practical challenges that warrant careful attention. Given the rapid spread of this technology, addressing these issues requires incorporating diverse stakeholder perspectives, especially those of students, to harness the benefits effectively while mitigating potential ethical and academic risks.

3 | Methodology

To investigate university students' familiarity in using GenAI systems and to analyse their perceptions and future visions of these technologies, we focused on the Italian context, with particular attention to students enrolled in degree programmes at different levels (undergraduate, master's and PhD) at the University of Udine. A multi-method approach was employed, combining questionnaires and semi-structured interviews, to gain a more nuanced understanding. The combination of different data types is not a novel concept. Indeed, the use of multiple methods has long been theorised (e.g., Jick 1979). As societies become increasingly complex, the necessity for such an approach to capture the various dimensions of a single phenomenon increases. It is also known as mixed-methods research, which involves the collection and integration of data from a variety of sources, employing both qualitative and quantitative approaches to obtain a more comprehensive understanding

(Teddle and Tashakkori 2009). The sequence of the methods in this study was intentionally designed to begin with the quantitative survey, followed by qualitative interviews. Although it is common to use an exploratory qualitative phase in mixed-methods research to inform a subsequent quantitative phase, we chose to reverse this sequence for two key reasons. First, the quantitative survey allowed us to capture broad trends and demographic patterns from a large and diverse student population ($N=531$). Second, the survey findings were instrumental in identifying specific themes and underexplored areas regarding a new phenomenon, which then guided the interviews. This enabled us to tailor the qualitative phase to address the most relevant and meaningful issues.

The survey was designed with a combination of closed-ended questions, open-ended questions and Likert-scale items, which were grouped into six categories: demographic data, familiarity with digital tools, use of GenAI tools for personal and academic purposes, opinions on GenAI and HEIs, professors' attitudes towards these tools and perceptions of the future of GenAI. For reasons of space, we present only the results relating to the analysis of closed-ended and Likert-scale items here.

The questionnaire was distributed via the University of Udine's Public Relations Office mailing list to all students enrolled in bachelor's, master's and doctoral programmes ($N=15,018$) during the first semester of the academic year 2023–2024, precisely 1 year after the public release of ChatGPT. A total of 531 students responded to the survey within a 6-week period. Of these, 56.9% identified as male, 40.9% as female and 2.3% as other. Due to the presence of some students of a rather advanced age, the average age of the sample is 24.8 years (minimum 18, maximum 65), with a median of 22 years and a mode of 19 years; 75.9% of the respondents are between the ages of 19 and 25 years. Two-thirds of the respondents (66.9%) are enrolled in a bachelor's programme, 29.8% in a master's programme and the remaining 3.4% in a PhD or postgraduate master's programme. The majority of the sample attends courses in industrial and information engineering, as well as computer science and ICT, where a statistically significant gender gap can be observed, with a clear predominance of males. This reverses in favour of a female majority for degree courses such as education and training, literature-humanities, linguistics and medical and pharmaceuticals.¹ The specific manner in which the sample was constituted, based on students' willingness to take part in the survey, indicates that students enrolled in more 'digital' degree programmes were more interested in the topic addressed within the questionnaire. The quantitative data were analysed using the statistical software package SPSS, version 26.

To gain further insights into students' practices and to obtain a more detailed view of their experiences and perceptions, the questionnaire was followed by semi-structured face-to-face interviews. The interviews were conducted by three interns from the authors' research lab. To ensure a consistent and professional approach, the interns underwent training supervised by a researcher affiliated with the lab. Each intern conducted 20 interviews, resulting in a total of 60 interviews. The interviewees ($N=60$, of which 34 were male and 26 female) were all students enrolled at the University of Udine, with diverse educational backgrounds. These included both undergraduate

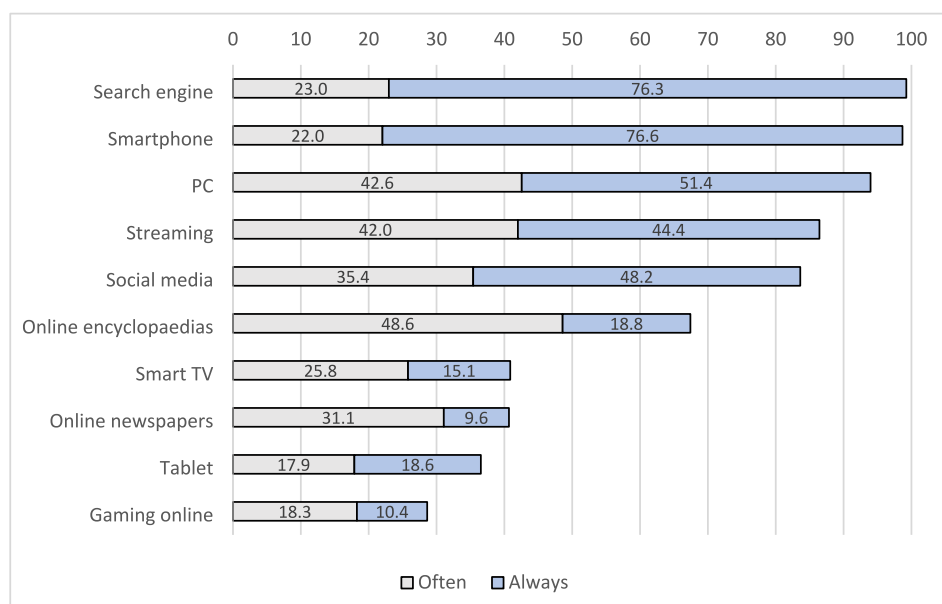


FIGURE 1 | Use of digital devices/services (%).

and postgraduate students, as well as those enrolled in different academic programmes, such as banking and finance, nursing, multimedia science and technology and product system design. Participation in the study was on a voluntary basis, and the participants were informed of the study's objectives. The interview guidelines were carefully developed to align with the aims of the study and build on the findings from the quantitative survey. A draft of the guidelines was tested in a small pilot study involving three participants. Feedback from this phase helped adjust the phrasing and sequence of questions to enhance clarity and flow. All interviews were conducted one-on-one and lasted around 30–60 min, with an average length of approximately 40 min. All interviews were audio-recorded with the participants' consent, transcribed in their entirety and analysed using the MAXQDA software. The textual data were then coded to identify the most relevant and significant thematic categories related to the study's aims (Boyatzis 1998; Guest et al. 2012; Ryan and Bernard 2003). The coding process involved three researchers, thus ensuring a collaborative and rigorous approach to analysing the qualitative data.²

4 | Survey Results

4.1 | Level of (Self-Declared) Digital Competence

Most respondents (75%) reported a high level of digital competence, with 58.4% rating their skills as 'good' and 16.6% as 'very good'. A quarter rated their competence as 'poor' (23.5%), while only 1.5% selected 'very poor'. A statistically significant association was found between gender and self-reported competence, with female respondents giving lower ratings, particularly for the response 'very good' (Female: 6.9% vs. Male: 23.2%, Other: 25%) χ^2 (2, $N = 531$) = 27.765, $p = 0.000$, $\phi_c = 0.162$. A significant association was also found with course level: 'very good' ratings were given by 12.1% of bachelor's, 25.3% of master's and 27.8% of doctorate students.³

4.2 | Degree of Digital Device and Online Service Use

Self-declared digital competence was supported by frequent use of digital devices and services (Figure 1). Besides the widespread use of search engines and smartphones (typical of the entire prevailing age group of respondents), the high use of personal computers, an 'older' device, now used almost exclusively for more specialised and complex tasks (because 'simple' tasks can easily be completed on faster and more flexible smartphones), stands out. This supports the idea that our sample is particularly 'digital'. Our observations on the relationship between PC use and 'more complex' digital practices are confirmed by the statistically significant association between the variable 'PC use' and the level of the course of study. A total of 44.5% of three-year degree programme students reported using a PC, compared to 64.6% of master's degree students and 72.2% of master's or doctoral students.⁴ Digital service and device usage is broadly consistent across the sample, except for social media, which is significantly associated with the female gender.⁵ In general, multiple statistically significant associations between 'digital competence' and the use of PCs, tablets, digital encyclopaedias, online newspapers and gaming confirm the reliability of the initial self-report.⁶

4.3 | Current and Future Personal and Academic Use of ChatGPT

At the time of the survey, over two-thirds of the sample indicated that they were already using ChatGPT or similar resources for their personal activities, out of curiosity, or for recreational purposes (69.7%). This percentage declines significantly when respondents are asked about their use of such resources for university-related activities (40.9%). A statistically significant correlation appeared between gender and ChatGPT use, with female respondents reporting lower usage for both personal activities (female 56.2%; male 79.5%; other 66.7%) and academic tasks

(female 30.4%; male 48.0%; other 50.0%).⁷ When disaggregated by degree programmes, our data show that the courses in which students most frequently use ChatGPT for academic purposes are political-social and communication courses (Figure 2), but the correlation between course type and ChatGPT use for academic purposes is not statistically significant.

Conversely, when considering the use of ChatGPT for personal activities, curiosity, or recreational purposes, the data in Figure 3 illustrate a distinct pattern and a statistically significant association. Here, as might be anticipated, students enrolled in the computing and ICT and industrial and information engineering courses were more likely to report using AI than their peers.⁸ Additionally, a strong direct association appeared between ChatGPT use and self-reported digital competence, particularly in personal activities.⁹

The dynamics remain consistent regarding the intention to use these resources in the future, although they become more pronounced, with approximately 10% more respondents indicating that they would use AI for university-related activities. The stated future use of ChatGPT for personal activities exhibited a statistically significant association with gender,¹⁰ while future academic use still exhibited a prevalence of male responses, although the association was not statistically significant. Examining actual data rather than intentions, the gap between personal and academic use appears unexpectedly large (Figure 4). It seems unlikely that 28.8% of students use ChatGPT for personal activities but not for their primary activity—their university studies. Additionally, the fact that data on use for personal activities are statistically significantly associated (in terms of effect size) with degree programmes, while data on academic use are not further supports this doubt.

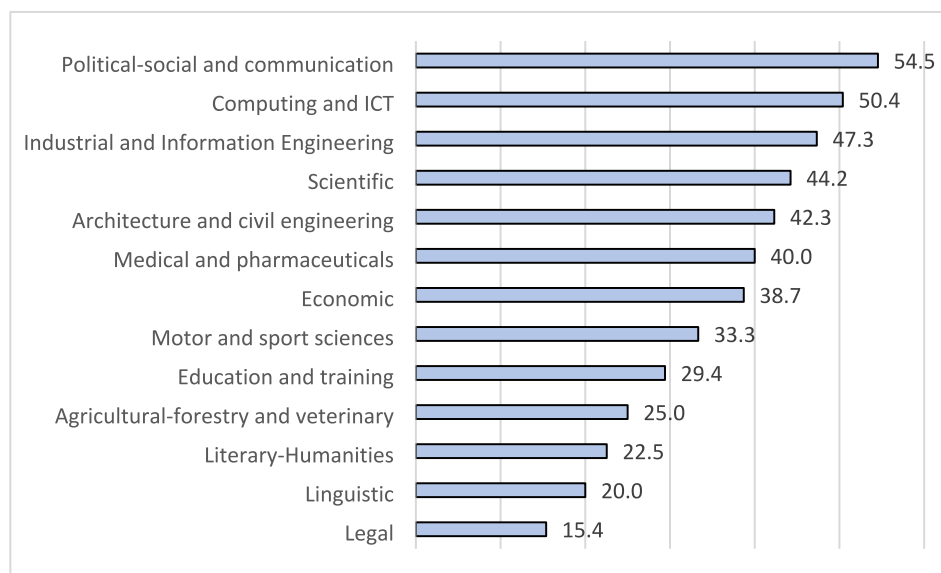


FIGURE 2 | Use of ChatGPT or similar resources for assignments or exams (%).

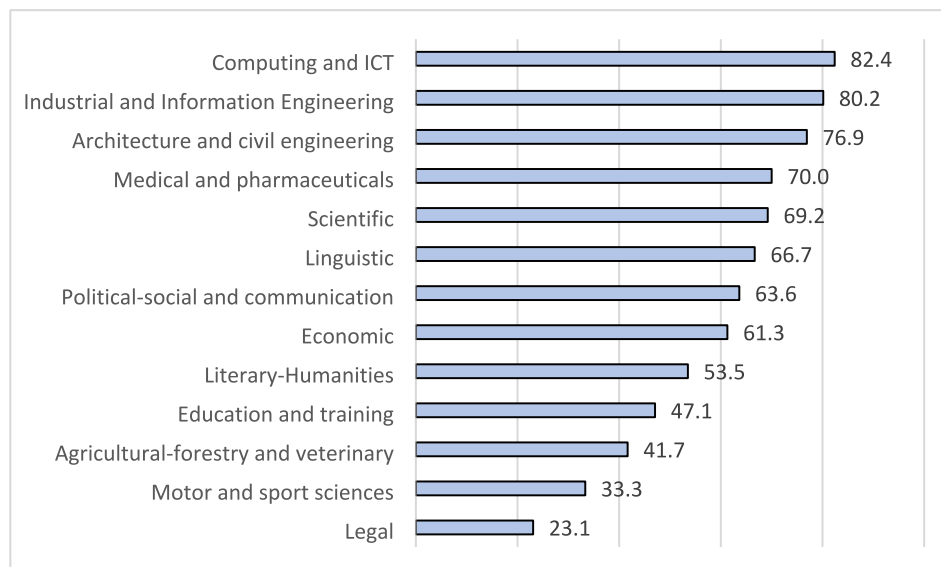


FIGURE 3 | Use of ChatGPT or similar resources for personal activities, curiosity or recreational purposes (%).

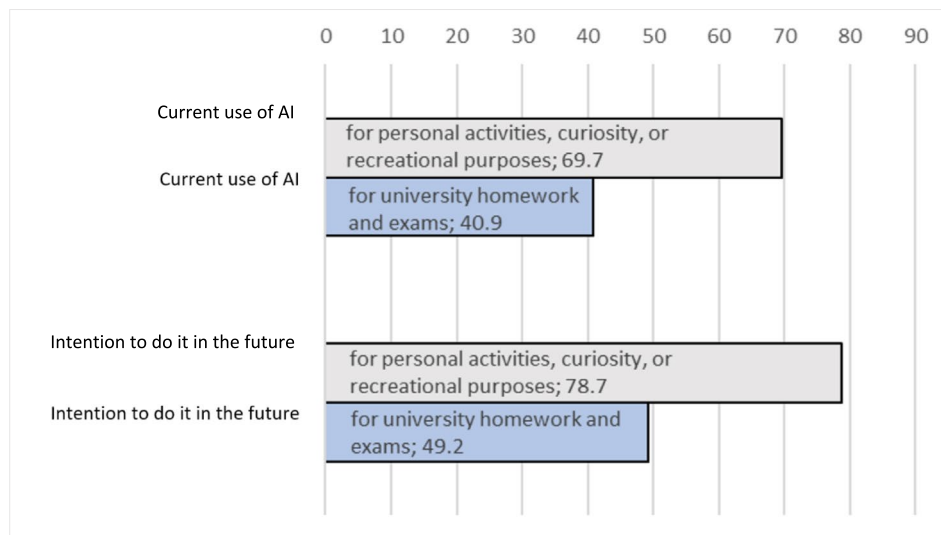


FIGURE 4 | Actual and future use of ChatGPT or similar resources for academic or personal activities (%).

This raises the suspicion that at least some of the answers given by the 28.8% of students who claim to use GenAI only for personal activities may not be truthful; this may be (a) a form of social desirability in the answers—‘it is not nice to say that I use it for university—that is, I do, but I prefer not to say it’; (b) a bias related to how the convenience sample was composed, linked to the fact that the suggestion to complete the questionnaire came from an official university channel; (c) a possible lack of confidence in the actual anonymity of the responses, which could therefore be used ‘against them’ and (d) an underlying doubt about whether ‘can it be done or not’ (in fact, at the time of the interviews, the University of Udine had not yet made any official statement on the matter).

In any case, if we isolate the specific group of students who say they use ChatGPT for personal activities but not for academic ones, we notice a significant prevalence of the male gender¹¹ and particular degree programmes: linguistics¹² (more than architecture and civil engineering, industrial and information engineering, literature-humanities and computer science and ICT, in that order). Language degree programmes are clearly very directly influenced by the use of resources such as ChatGPT or other AI-based translators (e.g., DeepL, for instance). Indeed, the increasing effectiveness of these systems threatens to undermine numerous academic activities traditionally envisaged within these courses. Similar arguments can be applied to computer engineering or ICT courses and programming, where support or replacement by GenAI systems is increasingly effective and easy. The strong presence of students on language courses—and, more generally, the composition of this particular group of students—reinforces the suspicion that their responses about the use of AI within the university may actually be underestimated due to their reluctance to declare it openly.

4.4 | Ways of Using ChatGPT to Complete Assignments

The students were then queried on their use of ChatGPT and similar resources for completing academic tasks. The

responses were divided into categories: (a) using the AI system solely for a minor component of the task; (b) integrating the AI system into a significant portion of the task, followed by manual verification and rectification and (c) employing the AI system for the entirety of the task, without any form of verification. The response options also included (d) of ‘I do not use AI for university’, and as the question was posed to all respondents (including those who had previously stated they did not use AI for academic activities) this stimulus also served as a control question. Regarding AI-assisted university work (Figure 5), most students (42.6%) reported using ChatGPT for only a small part of their tasks, while 6.2% admitted to using it for most of the work. Almost no one claimed to rely entirely on AI without verification.¹³

The most interesting aspect of these data is that, when the three distinct modes of use are aggregated, the resulting percentage of students who have used ChatGPT for academic purposes is considerably higher than the proportion of respondents who had previously acknowledged using ChatGPT in the context of the initial survey question. Figure 4 shows that 49.2% of respondents – nearly half – had used AI for academic tasks, compared to the 40.9% who initially admitted to it. This suggests that at least one in two students at the University of Udine already employed ChatGPT or similar tools for university at the time of the survey.

4.5 | Students’ Opinions on GenAI and HEIs

Our interpretation (the tendency for students to underreport their ChatGPT use, possibly viewing it as partial ‘cheating’, at least in response to a question from the university in which they are enrolled) is reinforced by their responses to opinion-based questions.

The response to the item that ‘universities should regulate the use of ChatGPT and promote responsible use among students’ stands out (Figure 6). Over 80% of respondents agreed with this opinion, with 37.3% using the strongest response on the

semantic scale, that of 'totally agree'. Similarly, most students agreed that using ChatGPT for homework and exams is 'morally wrong', with one in three strongly agreeing. A smaller but notable portion (one-third) claimed that ChatGPT use 'defeats the purpose of education.'

The only statement in which there is a clear divergence of opinion (80.5%) concerns the opinion that the 'university should prohibit the use of ChatGPT' ('totally disagree': 47.5%; 'quite disagree': 33.0%). This response is gendered: 53% of males chose this option, compared to 40% of females and 41.7% of others.¹⁴ Students enrolled in language courses were the most likely to agree that universities should prohibit the use of these resources (20% of them chose this answer). In conclusion, students favour regulation over prohibition. Views on its moral implications and educational impact remain divided, with both positive and negative perspectives emerging.

4.6 | Perceived Effectiveness

In terms of the perceived effectiveness of the results provided by ChatGPT, two-thirds of students agree that these results are 'exchangeable for human'. However, these 'human-exchangeable' results, which are set to become 'the new normal', do not appear to be as accurate and trustworthy as might be expected. Fewer than one in five students find these results to be accurate and credible (Figure 7). The timing of the survey may have influenced these perceptions, as it coincided with a period when ChatGPT was less effective. There may also have been limitations in the ability to use the system due to its nascent stage. It is evident that prompt engineering, the manner in which requests are formulated and the clarity of the tasks themselves (all of which depend on the specific capabilities of the AI system employed) have a significant impact on the quality of the results obtained. These are all factors that, a mere year after the launch of ChatGPT, could

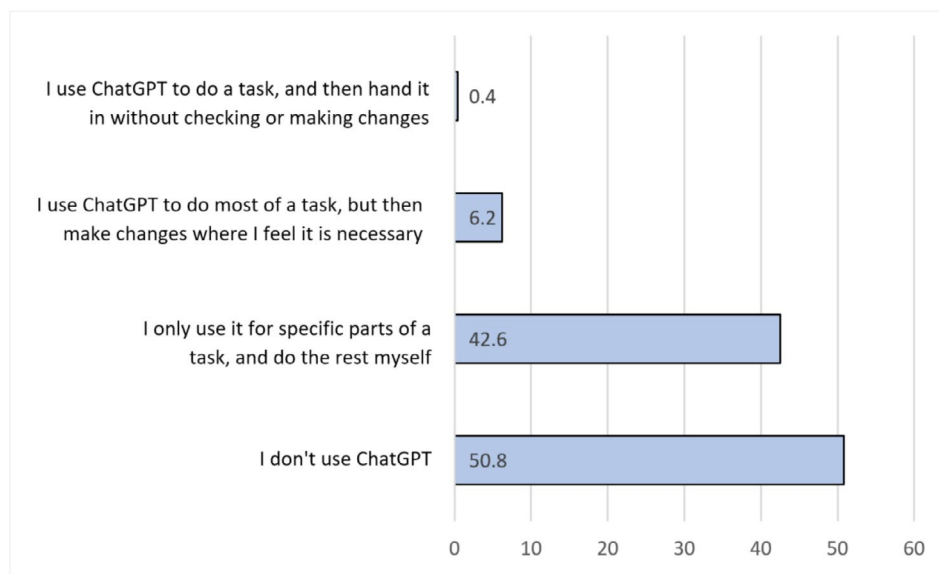


FIGURE 5 | Different modes of using ChatGPT or similar resources to conduct academic activities (%).

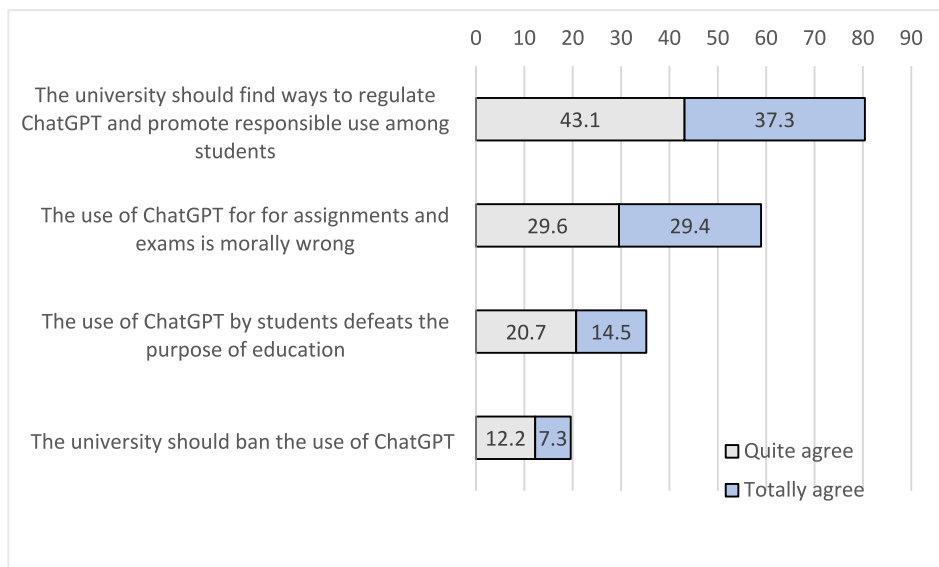


FIGURE 6 | Students' opinions on GenAI and the university (%).

not have been developed to the same extent by either the AI or the students. Even so, a third of the students (the same who expressed reservations about the credibility and reliability of the results) nevertheless admitted that this system produces results that are 'better than they could achieve on their own'.

4.7 | The Impact of GenAI on the Future of 'Human Abilities'

Respondents' views on AI's impact on human abilities reveal a complex and contradictory picture (Figure 8). Most students foresee a positive effect on information searching and understanding but identify negative consequences for writing, creativity

and reading skills. AI's impact on critical thinking and general thinking is also perceived as highly negative. It is evident, however, that these two capacities, which would be negatively affected by AI use, are closely intertwined with those abilities that would be enhanced. This leads to a rather contradictory overall picture, with the data pointing to a predominantly negative impact, particularly among less digitally literate respondents.

4.8 | Impact on Education, Work and Society

When asked about AI's potential negative consequences, students expressed significant concerns about its impact on work and society as a whole. However, when the focus of the question

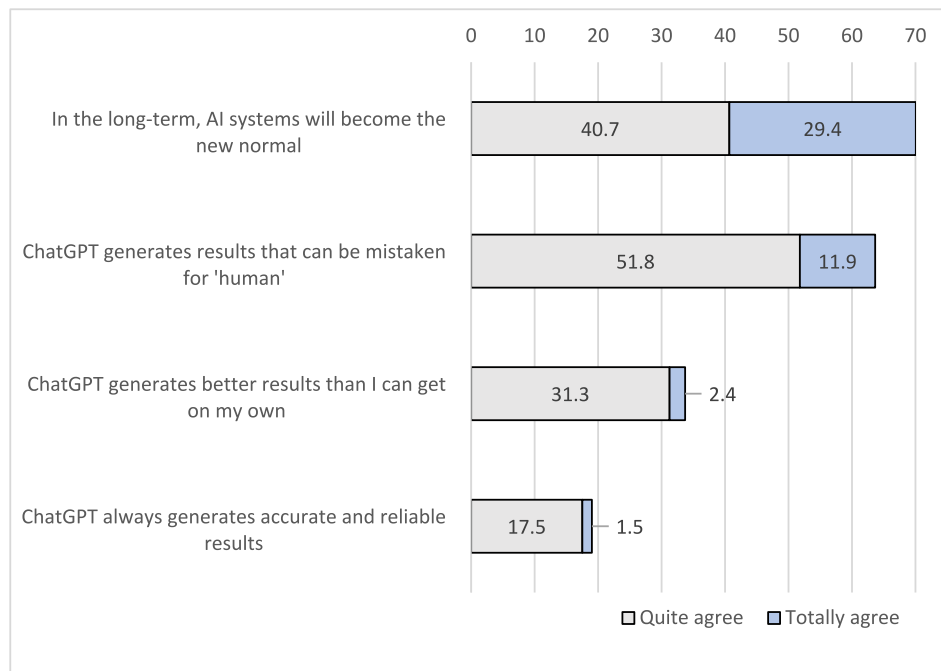


FIGURE 7 | Perception of the effectiveness of results (%).

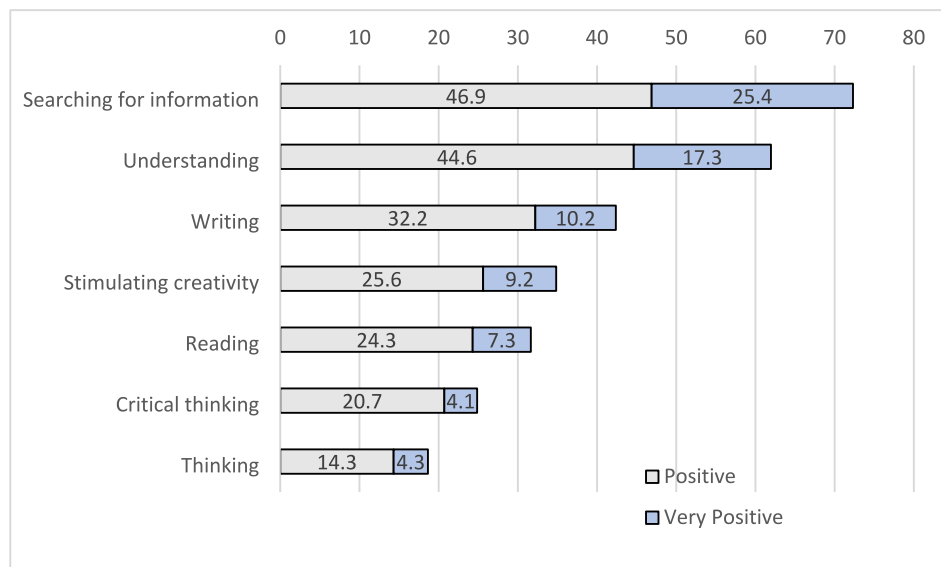


FIGURE 8 | The impact of GenAI on the future of 'human abilities' (%).

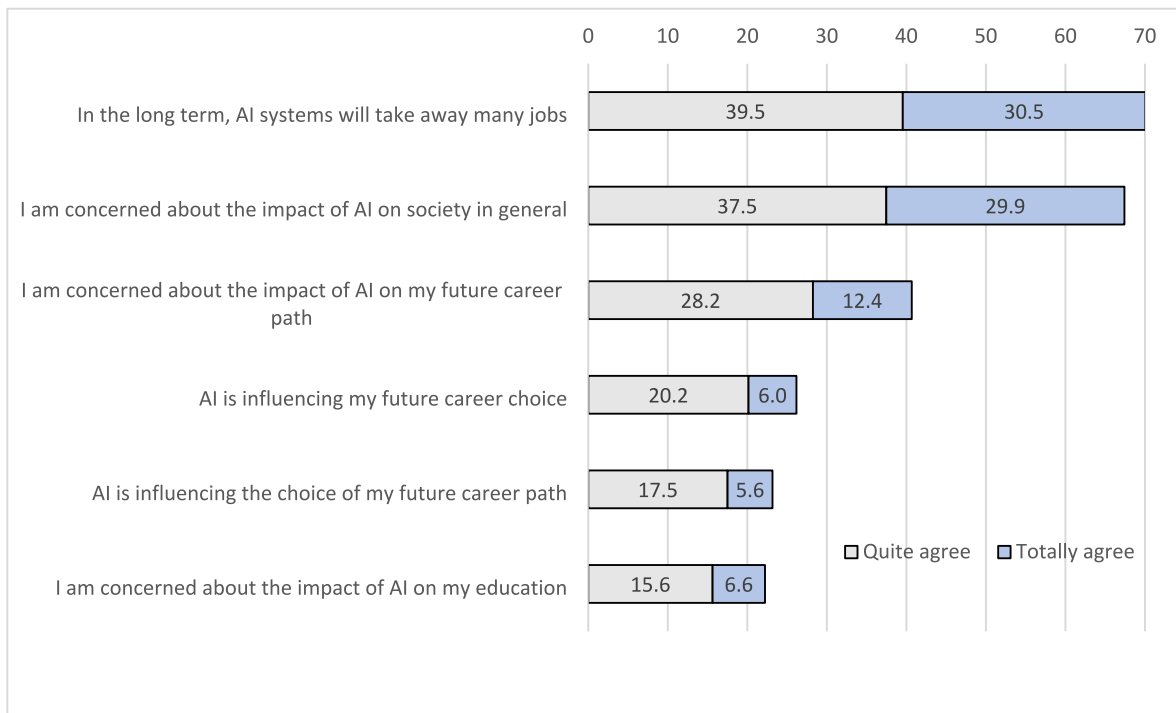


FIGURE 9 | Concerns about the impact on education, work and society (%).

shifted to the impact on their daily life and the issues that affect them most, these concerns became less prevalent (Figure 9). About 40% worried about their future careers, while only 22% were concerned about their education. These negative impacts also do not appear to significantly influence their choices regarding their education or their future professional careers.

Overall, students exhibited strong concerns about AI's systemic impact but appeared to feel less affected personally. This stance could be summarised as: 'The concerns exist, but they do not directly affect me.' This position is not contingent on gender or degree programme. It also seems probable that the high level of concern expressed about systemic aspects is influenced by social desirability bias, possibly as a result of the discourse on AI imprinted by the Italian media, in which these systemic concerns are largely present. The negative effects would be reduced if the argumentation were to become more closely aligned with the respondents' lived experiences and more 'practical'. This interpretation is corroborated by the fact that, even in the context of the question regarding the potential loss of employment in the future, bachelor's students were the most concerned (34.9% of them provided the clearest responses in this regard), compared to 23.4% of master's degree students and only 5.6% of PhD students.¹⁵

4.9 | Teachers' Attitudes and Behaviour (Student Perspective)

Upon collection of the questionnaires, the University of Udine's teaching staff appeared to be somewhat unresponsive on the issue of GenAI use. The dimension most frequently indicated by the students pertains to discourse delivered by professors on the ethical use of ChatGPT, which is largely theoretical and idealistic, thus rendering it impractical. The remaining responses, which relate to more active or assertive behaviour on the part of

the professors, indicate that negative dimensions prevail. This appears to foreshadow an oppositional attitude on the part of the teaching staff towards this technology—that is, open criticism of or, although to a much lesser extent, a ban on their use. Only 6% of the teaching staff used ChatGPT in the classroom (Figure 10).

While stressing that the basic attitude of the teaching staff towards the emergence of these new technologies seems to be either 'abstract' or 'oppositional', the most striking finding is that nearly 85% of students perceived no active response from their professors on this issue. From an institutional perspective, this lack of engagement is concerning, particularly given the strong student demand for clarity on ChatGPT's legitimacy and appropriate use: 80% of respondents called for universities to 'regulate and promote responsible AI use'. At least at the time of the survey and interviews, there was little or no information available for students on this point, although the use of ChatGPT to complete academic tasks was already widespread.

5 | Interview Data Results

The qualitative analysis of the student interviews offers a nuanced understanding of the role of GenAI tools in education. This section presents the main findings, which have been organised around six primary thematic categories identified through content analysis.

5.1 | Educational Applications and Uses of GenAI Tools

Students predominantly viewed these systems as valuable supplementary aids that enhance their educational experience through multiple functions.

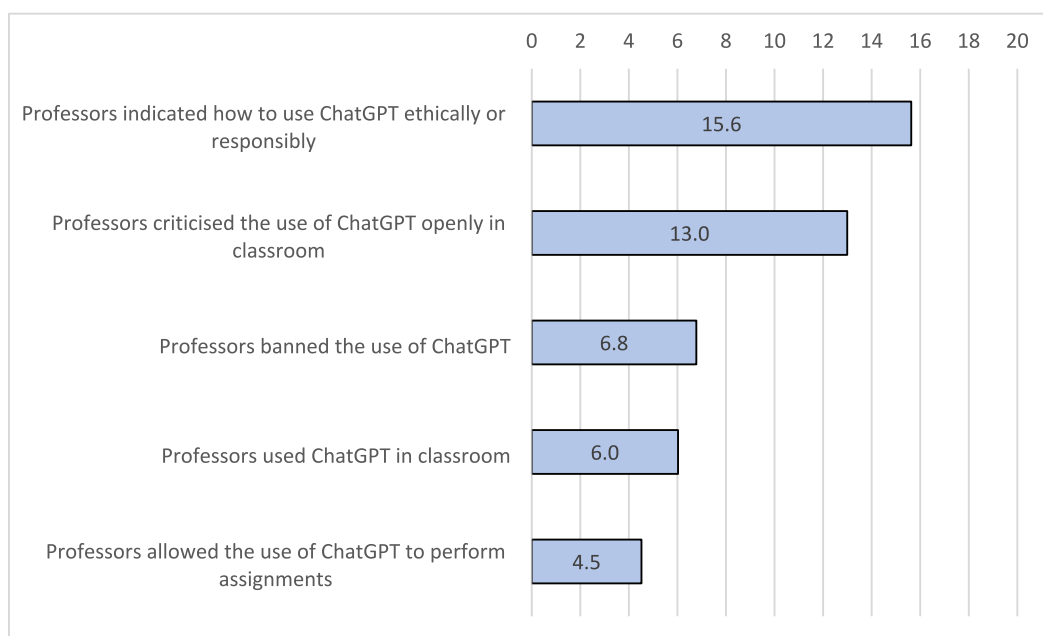


FIGURE 10 | Instructors' attitudes and behaviour—student perspective (%).

For me, AI is a tool that should not be underestimated because it can be very useful. From the point of view of my design course it's a great tool to use either as a shortcut to maybe instead of wasting time, for example with Photoshop, editing a photo you have the AI do a short search and so on. It reduces your time a lot.

(Interviewee 31)

These primary functions include text summarisation, concept clarification, creating exam simulations for pre-exam competency testing and assisting with specific tasks and exercises.

I asked ChatGPT what geometric Brownian motion was, because I was studying the Black-Scholes equation, which is about the mathematics of uncertainty – it's in my master's degree in banking and finance – I said, 'OK, I don't know anything about it, I'm not going to look up the answer on the slides. I'll ask someone or something directly and they'll give me the information I want in a more concise way', let's say.

(Interviewee 18)

A particularly significant trend emerges in the heightened interest in GenAI tools among students enrolled in courses related to digital technologies or creative disciplines. This includes students pursuing degrees in multimedia science and technology, as well as those enrolled in master's programmes in multimedia communication and information technology or design. This pattern suggests a correlation between the nature of their studies and the perceived benefits of AI technologies.

The added value is great, because in addition to ChatGPT or Midjourney, anyway, Discord is also bringing a lot of bots and a lot of new types of AI – also, for companies that in a way are using it to optimise their way of selecting new employees. So (...) AI, I believe, in this century will change a lot the way we relate to work, especially, to school and also to our everyday life, as well as Alexa or other kinds of virtual systems and assistance.

(Interviewee 27)

Beyond formal academic applications, students reported experimenting with GenAI tools in diverse ways, such as generating computer programming code, creating digital images and formulating questions to test and explore the capabilities of AI.

I also used it a bit recreationally, in the sense that I tried to ask it questions – tried to trick it. Like with my friends, we tried to ask it if it felt emotions. Then it did us a favour because it answered our question, we said 'thank you', it said, like, 'happy to help you', and then we went and asked it, 'but you told me you couldn't feel emotions.' Then you could see that it corrected itself, so I mean, we kind of played around with that.

(Interviewee 56)

5.2 | Benefits and Efficiency Gains in Academic Settings

The analysis of perceived advantages revealed several key benefits of GenAI systems in academic settings. Students

emphasised significant efficiency improvements in producing academic work and assignments, expanded research opportunities beyond those available through non-AI resources and enhanced support for creativity. These advantages enabled students to focus more on higher-order thinking and complex problem-solving tasks: 'It reduces your time a lot; it has to be used sparingly like that, but in my opinion, it's a very useful tool' (Interviewee 46). Perhaps most significantly, GenAI tools enable students to explore a wider range of topics and perspectives. As one respondent put it, the potential applications for these tools are

infinite, in the sense that thanks to these tools one could also go off and create a brand, learn new skills, abilities and have answers immediately without having to do the research oneself.

(Interviewee 51).

5.3 | Limitations and Technical Constraints

Despite the perceived benefits, students identified several significant limitations in the use of GenAI systems. A primary concern centred on the reliability and accuracy of AI-generated content, which presents particular challenges in academic settings where precision and rigour are paramount:

I think these types of tools, used in the field of study to increase one's knowledge, should be supportive. At least in my experience, for example (...), ChatGPT in the mathematical field has disappointed me a lot with the degree of accuracy. Personally, I still don't trust it completely as a final solution, but more as support, as confirmation.

(Interviewee 19)

Another significant limitation emerged in the interaction with a non-human actor, because it lacks the nuanced understanding and empathy that human educators provide. This artificiality can hinder the development of meaningful learning experiences and the building of strong student-teacher relationships:

You can still feel that it is a robot, it has no emotions, no feelings, it is not comparable to a person.

(Interviewee 06)

Students also noted that the system did not appear to offer much supporting information or lessons that could not be provided by the lecturers. This observation reinforces the view that while GenAI tools can be valuable aids, they cannot replace the depth and quality of human instruction. A final practical constraint concerned the subscription fee required to access the full range of system functionalities, which potentially creates financial barriers for some students and exacerbates existing inequalities in access to educational resources:

Maybe that's a problem, to pay to use it. Here, though, I don't know.

(Interviewee 13).

5.4 | Academic and Educational Concerns

The respondents also identified several risks associated with the use of GenAI systems in the academic sphere, such as the potential impoverishment of the learning experience, particularly regarding knowledge and skills. A primary concern is that over-reliance on AI tools may lead to a superficial understanding of complex subjects, as students may become passive consumers of information rather than active learners.

(The risk is) somehow losing the method of analysing a given topic. That is, searching for sources, whether paper or not, (...) in this case they would not have that experience of being able to understand how to do that kind of research.

(Interviewee 34)

Another perceived risk is the increased individualisation of the learning experience, which may reduce opportunities for collaborative learning and peer interaction. Collaborative learning is a key component of education that fosters communication, teamwork and diverse perspectives. A reduction in these interactions can negatively affect students' social skills and their ability to work effectively in team settings, as some respondents noted: 'Very little sociality, in the sense, if you have an AI that gives you everything, maybe study groups won't be used anymore, that's the only (thing) I can think of' (Interviewee 11).

Moreover, there is concern that the use of GenAI tools may lead to a reduction in creativity, as students may rely on AI-generated content rather than developing their own original ideas and solutions: 'The fact that you maybe go to, say, block the productivity or creativity of the individual' (Interviewee 58). Another significant risk identified by the respondents is the potential for cheating on assignments and exams. The ease with which students can access AI-generated answers raises ethical concerns and undermines the integrity of the educational process:

The risk is first of all becoming lazy, if a student has to prepare, maybe I don't know, a summary, a speech, I ask ChatGPT, basically in 10 minutes, it has the job done. But what does the student have at the end? Basically nothing, because the reasoning that was done to compose that speech, that text and so on, was not done by the student, but by the machine.

(Interviewee 03)

Additionally, GenAI systems may act as substitutes for lecturers and traditional materials such as books and handouts, which could diminish the role of educators and the value of traditional learning resources and effectiveness, and respondents express fear: 'that (it) could replace, for example, professors, could

replace books, could become a mechanism that overcomes the human being' (Interviewee 27).

5.5 | Broader Societal Implications

Students also pointed to potential negative impacts associated with the widespread use of GenAI tools. A significant concern was the potential for a reduction in social interactions, as individuals increasingly rely on AI rather than human interaction.

The social relationship between people could become lower, because even today we are much more attached to technology rather than social relationships, and with the growth of this (technology) the situation would get worse.

(Interviewee 16)

The emergence of new inequalities is another concern that was largely attributed to a generational gap in digital skills. Some participants indicated that younger generations may be more adept at using AI, while older generations may struggle to keep pace, creating disparities in access to and benefits from AI technologies.

Well, it's hard to say because it's still early days, but it could definitely leave behind people who are not resilient enough to venture into this world to be able to change even their aspect of how they relate to this technology, thus understanding how to exploit it. While on the other hand it could lead to a lot of people benefiting from it much more than others, also I think economically, because there are a lot of new jobs that are coming in now, that are being invented.

(Interviewee 24)

The respondents also highlighted potential negative impacts on certain professions and a reduction in jobs in specific sectors. While none of the students interviewed expressed concern about their future employment, there was a broader concern at a societal level regarding the displacement of jobs due to AI automation:

Eh, it's hard to say because it's still early days. Surely it will leave behind people who don't want to go down the path to this world to be able to change their aspect of relating to it as well, so figuring out how to exploit it, while on the other hand it could lead to many people benefiting from it much more than others.

(Interviewee 29)

Cultural homogenisation and a decline in critical thinking were also identified as potential negative impacts. According to some interviewees, the widespread use of AI tools may lead to

a uniformity of thought and a reduction in the diversity of ideas and perspectives:

The main risk is to believe that there is a one-size-fits-all answer. And this thing here is a bit like the world we live in now, it leads us to be lazier, to accept what we are told as taken for granted and may lower our level of criticality, so this is the main problem.

(Interviewee 32)

Additionally, concerns were raised regarding the potential privacy risks associated with the use of AI, particularly in relation to the handling of personal data and the potential for misuse: 'We might start to disrespect people's ethics, even for the fact of privacy, social ... we might become more exposed than we are now' (Interviewee 39).

5.6 | Future Perspectives and Regulatory Needs

While acknowledging various concerns, many students identified significant benefits associated with the growing use of GenAI tools, such as improvements in quality of life, an increase in cultural levels and more leisure time. The ability of AI tools to streamline tasks and provide instant access to information could enhance productivity and free up time for personal pursuits.

I think it will be used more and more now. What is the relationship between the development of one and the other? Probably it could be used for tasks where the human being struggles more and of course the human being has to be trained in so many tasks and so many people have to be trained. The moment you create the algorithm or train a machine – that can be used in various cases.

(Interviewee 42)

However, most interviewees also highlighted the necessity of adapting to 'artificial communication'. This involves the rapid acquisition of knowledge regarding the most effective methods of interaction with AI, including the ability to formulate appropriate queries or to acquire prompt-engineering skills. It also requires a reassessment of one's approach to everyday life and work.

A need for regulations governing the use of GenAI within university settings to mitigate any adverse consequences was also recognised. Students emphasised that establishing clear guidelines and ethical standards for AI use in education is essential to ensure that these tools are used responsibly and effectively. One respondent noted, 'I find it very interesting, but it has to be regulated and controlled, it can become risky' (Interviewee 51), while another said, 'I'm really in favour of AI, so I hope that maybe we can somehow try to create knowledge on how to use these AIs, because that's what's missing' (Interviewee 21).

In summary, while students recognised the potential of GenAI tools to enhance educational experiences and efficiency, they also caution against over-reliance on these systems due to their limitations and potential negative impacts. They emphasised that it is essential to address these concerns through appropriate regulations, ethical standards and education on effective GenAI use. Most interviewees concurred that the balanced integration of GenAI tools into the academic environment, coupled with a critical awareness of their limitations, could maximise their benefits while minimising potential risks.

It has both pros and cons. For example, one pro could be that it helps the student to better understand the subject he is studying, but at the same time it could influence him, let's say make him lose the desire to study, since it would already give him the answers, without perhaps making him think.

(Interviewee 08)

6 | Conclusions: Towards an Adaptive Balance

This study contributes to our understanding of university students' perceptions of ChatGPT and similar GenAI tools in the Italian educational context by identifying the perceived benefits, barriers and potential solutions of these technologies. Our findings both support and extend previous research in several key areas. First, like Chan and Hu (2023) and Hasanein and Sobaih (2023), we found that students primarily view GenAI tools as supplementary aids rather than replacements for traditional learning methods. Our study also revealed a more nuanced pattern of adoption, characterised by two distinct modes: exploratory use (curiosity-driven and experimental) and goal-driven use (integrated into academic routines).

Our quantitative data showed that approximately half of the students surveyed had already incorporated AI tools into their academic work, which is a higher adoption rate than reported in previous studies (e.g., Elkhodr et al. 2023). However, aligning with Ibrahim et al. (2023), we found significant variation in usage patterns across different academic disciplines, with notably higher adoption rates in technical and communication-focused fields. The interview data revealed a complex relationship between perceived benefits and risks that extended beyond the binary distinctions often presented in the existing literature. While students acknowledged potential benefits in efficiency and information access (in line with Lund et al. 2023), they also expressed sophisticated concerns about the impact on learning processes and academic integrity. This confirms, but also adds nuance to, the ethical concerns highlighted by previous researchers (Rudolph et al. 2023; Sullivan et al. 2023).

Addressing our first research question—‘How familiar are university students with GenAI tools like ChatGPT? To what extent do they use these tools for both personal and academic activities?’—two distinct modes of GenAI adoption were found among students. The first mode is exploratory, characterised by occasional and curiosity-driven use without specific objectives. The second mode is goal-driven, whereby students integrate

these tools into their routines with a certain level of familiarity. The use of ChatGPT in academic settings remains a matter of contention. Students acknowledged the potential benefits in various fields, while also expressing concerns about ethical issues, potential job displacement and other long-term consequences. At the time of the interviews, it was estimated that at least half of the students were already using ChatGPT or similar tools for university assignments, particularly those with higher digital competence. However, many students viewed this use as somewhat unethical and preferred to conceal it. This highlights the need for universities to establish clear guidelines and transparency regarding the use of such tools, as students are calling for greater accountability and regulation.

Regarding our second research question on students' perceptions of AI use and its benefits and challenges in the educational context, the respondents suggested that universities should regulate and clarify the use of these tools rather than prohibit them, particularly in degree programmes such as ICT and computer engineering for programming, and in language courses for translation. However, their opinions on the impact of these tools on human skills and potential negative consequences are mixed and sometimes contradictory. This ambivalence may be attributed to social desirability bias in their responses or the early stage of technology adoption during the interviews. This highlights the lack of guidance and the urgency for HEIs to balance the advantages of AI with its challenges to ensure that AI supports rather than undermines academic goals.

To ensure the effective integration of ChatGPT into the educational setting, it is of the utmost importance to consider the perceptions and experiences of students and address their concerns about academic integrity, privacy and the potential future impacts of these technologies. This would inform the development of strategies to mitigate risks and to promote the safe and productive use of AI tools. By engaging students in the discourse on the integration of AI, educators and HEIs can facilitate the development of a balanced approach that optimises the advantages of AI while addressing its limitations. This would enhance learning outcomes, maintain academic integrity and foster innovation. It is of paramount importance that HEIs value students' insights and address their concerns to ensure that AI tools are employed effectively without any compromise to the quality of education.

Fostering an environment that promotes critical thinking and independent research could also prevent the over-reliance on AI tools. Educators should emphasise the use of ChatGPT as a supplementary resource, rather than as the primary source of information. Continuous student feedback could inform the development of policies and practices that promote the ethical use of AI in education. The findings of this study can inform policymakers, educators, researchers and HEIs on the responsible incorporation of GenAI tools into educational practices. By understanding students' use and perspectives, HEIs can develop informed guidelines and strategies for incorporating these technologies while fostering ethical awareness among stakeholders. Some universities, such as the University of Udine, have already initiated the development of guidelines for the coming academic year.

Concerning our third research question on future (professional prospects), students expressed mixed views about the

impact of AI on their academic and professional future. While they showed limited concern about the personal implications and immediate impacts on their education or career, they voiced stronger reservations about societal-level impacts and anticipated significant systemic changes from AI adoption. This contradiction suggests a gap between abstract awareness of AI's transformative potential and a concrete understanding of its immediate implications.

Based on these findings, we propose several practical recommendations for educational stakeholders. Policymakers should develop clear institutional guidelines that legitimise appropriate AI use while maintaining academic integrity; establish discipline-specific frameworks that acknowledge varying AI applications across different fields; and create standardised protocols for detecting and addressing misuse. Educators should seek to integrate AI literacy into course curricula, focusing on both technical skills and ethical considerations; design assignments that leverage AI as a supplementary tool while maintaining focus on core learning objectives; and implement regular assessment methods that can effectively evaluate learning outcomes in an AI-enhanced environment. These recommendations should be implemented gradually, with continuous monitoring and adjustment based on feedback from all stakeholders.

While this study offers valuable insights into students' perceptions and use of GenAI tools, several limitations should be acknowledged. First, although the sample size was substantial, there was an overrepresentation of students from technical disciplines, which may have influenced the overall patterns of AI adoption and attitudes observed. Second, the rapid evolution of GenAI technologies may result in some findings reflecting the specific capabilities and limitations of these tools at the time of data collection (in late 2023). Third, the study's focus on a single university limits the generalisability of its findings to other educational and cultural contexts with different characteristics. Finally, the self-reported nature of the data, particularly in relation to the use of AI tools, may be subject to social desirability bias, as evidenced by discrepancies between the declared and actual use of these tools.

Given the evolving nature of these tools, further research is needed to monitor the relationship between GenAI and educational settings. This is essential because new capabilities and interactions are being introduced rapidly. Adoption practices are also changing quickly due to the interaction between human and AI actors as new GenAI tools enter the market. More people are also discovering and adopting these tools. Periodic reassessment is therefore essential, and future research could benefit from more detailed questionnaires to track changes in students' familiarity with these tools over time. Future research could also focus on specific student groups from different disciplines, academic backgrounds, age groups or cultural contexts to explore AI literacy. Investigating the attitudes, perceptions and practices regarding GenAI tools among university instructors would also provide a comprehensive understanding of the integration of these tools in academic settings, as well as their views on ethical implications and the benefits and drawbacks of AI in education. Examining

how lecturers' attitudes influence students' use of GenAI tools could offer valuable insights for aligning educational practices with technological advances.

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Ethics Statement

All procedures were conducted in accordance with the ethical standards set forth by the institutional and national research committee and with the 1964 Helsinki Declaration and its subsequent amendments or comparable ethical standards. Approval was granted by the Institutional Review Board of the Department of Mathematics, Computer Science and Physics of the University of Udine (approval date: 26/09/2023).

Consent

Prior to their participation, all individual participants were duly informed and provided with their consent. No data that could lead to the identification of the participants have been used, and the privacy of the participants has been safeguarded at all stages of the research.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from NuMe Research Lab. However, restrictions apply to the availability of these data, which were used under licence for the current study and are therefore not publicly available. The data are, however, available from the authors upon reasonable request and with the permission of the NuMe Research Lab.

Endnotes

¹ Because the data do not fully meet the assumptions of the normality test, a non-parametric statistical test was employed to assess the association between variables, such as the chi-square ($\alpha = 0.05$). The measure of association provided by Cramer's V was used to obtain an estimate of the strength of the association between variables (i.e., the "effect size"). Regarding the association between gender and degree programmes, the specific measures are: $\chi^2(2, N = 531) = 180.824$, $p = 0.000$, $\phi_c = 0.413$.

² An initial subset of the interview transcripts (10 interviews) was jointly coded by all three researchers. During this phase, any discrepancies in coding decisions were discussed and resolved collectively, leading to the refinement of the coding scheme. Following the joint coding session, each researcher independently coded another subset of interviews. Any remaining disagreements were resolved through discussion.

³ $\chi^2(2, N = 531) = 23.058$, $p = 0.001$, $\phi_c = 0.147$.

⁴ $\chi^2(2, N = 531) = 22.288$, $p = 0.001$, $\phi_c = 0.145$.

⁵ Social media use—Answer "always": female: 57.6%; male: 42.4%; other: 25%. $\chi^2(2, N = 531) = 20.714$, $p = 0.002$, $\phi_c = 0.140$.

- ⁶ PC: χ^2 (3, $N=531$)=79.398, $p=0.000$, $\phi_c=0.223$; tablet: χ^2 (3, $N=531$)=30.399, $p=0.000$, $\phi_c=0.138$; digital encyclopaedia: χ^2 (3, $N=531$)=51.901, $p=0.000$, $\phi_c=0.181$; online newspapers: χ^2 (3, $N=531$)=26.098, $p=0.002$, $\phi_c=0.128$; and gaming: χ^2 (3, $N=531$)=24.108, $p=0.004$, $\phi_c=0.123$.
- ⁷ Use for personal activities: χ^2 (2, $N=531$)=32.358, $p=0.000$, $\phi_c=0.247$; for academic activities: χ^2 (2, $N=531$)=16.607, $p=0.000$, $\phi_c=0.177$.
- ⁸ Course typology—use for personal activities: χ^2 (1, $N=531$)=55.076, $p=0.000$, $\phi_c=0.322$.
- ⁹ Digital competence—use for personal activities: χ^2 (1, $N=531$)=31.372, $p=0.000$, $\phi_c=0.243$; digital competence—use for academic activities: χ^2 (1, $N=531$)=18.736, $p=0.000$, $\phi_c=0.188$.
- ¹⁰ Gender—use for personal activities: female: 73.3%; male: 83.4%; other: 58.3%. χ^2 (1, $N=531$)=10.845, $p=0.004$, $\phi_c=0.143$.
- ¹¹ Female: 27.6%; male: 31.8%; other: 33.3%. χ^2 (1, $N=531$)=25.633, $p=0.000$, $\phi_c=0.155$.
- ¹² Linguistics: 46.7%; architecture and civil engineering: 34.6%; industrial and information engineering: 34.4%; literature-humanities: 32.4%; computer science and ICT: 32.0%.
- ¹³ It should be noted that isolating the degree programmes for this specific answer (i.e., “I use ChatGPT to do most of the work”), those who chose it the most (13.3%) are precisely the students in language courses, followed by students of political-social and communication, computer science and ICT, and industrial and information engineering (9.1%, 8.8%, and 7.6%, respectively).
- ¹⁴ Statistically significant association: χ^2 (2, $N=531$)=19.895, $p=0.003$, $\phi_c=0.137$.
- ¹⁵ Statistically significant association: χ^2 (2, $N=531$)=30.021, $p=0.000$, $\phi_c=0.168$.

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